

shallow pools about half tide-mark at the East Rocks. These, with others of the same size from various parts of the British shores, were considered fine specimens by Prof. Häckel*. For several years they have been extremely rare, only one or two having been secured after diligent search. A series of large and beautiful examples, however, somewhat suddenly made their appearance this autumn on the seaweeds on the rocks near the mouth of the harbour; indeed, they occurred in considerable abundance and all were several times as large as formerly. They were first noticed by my excellent assistant Mr. Pentland Smith; but a more detailed study of them has been undertaken by Mr. W. L. Calderwood, who will probably investigate the life-history as well as the structure of the species.

LXII.—*Contributions to our Knowledge of the Myriopoda of Dominica.* By R. I. POCK, of the British Museum (Natural History).

[Plate XVI.]

MOST of the specimens which form the subject-matter of the present paper were collected by Mr. G. A. Ramage under the superintendence of the West-Indies Exploration Committee. Those specimens, however, of which the names are marked with an asterisk were taken in 1883 by Mr. G. F. Angas.

I. CHILOPODA.

Fam. Scolopendridæ.

Scolopendra alternans (Leach).

Scolopendra alternans, Leach, Trans. Linn. Soc. xi. p. 383, et auctt.

Four specimens.

This species appears to be generally distributed throughout the West Indies; it occurs also in South America. The British Museum possesses specimens from St. Kitts, Antigua, Haiti, Colombia, and one from South Africa.

For additional localities and a list of synonyms for this species see Meinert, Proc. Amer. Phil. Soc. xxiii. p. 193.

* Vide 'Syst. d. Medusen, Vorwört,' p. xviii.

I take this opportunity of stating that from an examination of the types I am able to corroborate the view entertained by Dr. Meinert concerning the specific identity of the following forms :—*alternans*, Leach, *Grayii*, *complanata*, *multispinata*, Newport, Ann. & Mag. Nat. Hist. xiii. p. 98 (1844).

Otostigma cormocephalinum, sp. n.

Shining, with almost metallic lustre. Tergites, sternites, legs, and antennæ olivaceous; head-plate and maxillary feet and sternite castaneous.

Antennæ short, scarcely as long as the head-plate and the first two tergites, thicker at the base, composed of sixteen or seventeen segments, of which the proximal six are bare, the rest being densely hirsute.

Head-plate sparsely but somewhat deeply punctured, its posterior two thirds furnished with two conspicuous anteriorly diverging sulci.

Maxillary feet and *sternite* manifestly punctured, the latter marked in front with two deep sulci which, arising close together near the inner margins of the prosternal plates, extend nearly to the hind margin of the sternite and break up into branches which are arranged subsymmetrically upon the two sides; the anterior half of each of these sulci is united with that of the opposite side by two transverse branches. Prosternal plates well developed, widely separated, each being divided in front into two teeth, the internal of which is larger and bi- or tridentate. Basal tooth distinctly bidentate.

The *tergites*, including the first, but with the exception of the last, strongly bisulcate, with the exception of the first eight or nine marginate, the first three feebly punctured, all of them slightly rugose.

Sternites, with the exception of the first and the last, strongly bisulcate, all of them slightly rugose.

Anal tergite with a conspicuous median longitudinal sulcus; anal sternite wide, with gently converging lateral margins, rounded postero-lateral angles, and convex posterior margin; anal pleurites marked with remarkably large, interspersed with smaller punctures; the superior and posterior margins not punctured; the posterior inferior angle not elongated into a process of any kind, but simply armed with a small spine; there is a second small spine in or near the middle of the posterior margin.

Anal legs broken off.

All the *legs* are without tarsal spurs, but the claws are furnished at the base with two small spines.

Length 37 millim.

A single specimen.

This species is of peculiar interest, inasmuch as it appears to partake of the characters of the two genera *Otostigma* and *Cormocephalus* and in a measure to fill up the interval between them. Although by the form of its tracheal apertures it is undoubtedly referable to the former, as characterized by v. Porath, yet it differs from all the specimens of this genus that I have examined in the total absence of tarsal spurs and in the presence of the two conspicuous abbreviated cephalic sulci, features which are conspicuous for their constancy in *Cormocephalus*.

It is unfortunate that, owing to the absence of the anal legs, certain additional specific characters cannot be given; but the occurrence of the two conspicuous sulci upon the first tergite and the large size of the pleural pores serve to differentiate this species from all others with which I am acquainted.

Scolopocryptops Meinerti, sp. n.

? Syn. *Scolopocryptops Miersii*, Meinert, Proc. Amer. Phil. Soc. xxiii. p. 181 (1886).

Nec syn. *Scolopocryptops Miersii*, Newport, Trans. Linn. Soc. xix. p. 405 (1845).

Shining; tergites castaneous, sternites, legs, and antennæ paler.

Antennæ long, attenuate, composed of seventeen segments; proximal three segments sparsely hirsute, the rest thickly clothed with short hairs; segments cylindrical, ultimate segment about equal in length to the penultimate.

Head-plate almost circular, deeply but sparsely punctured, and scantily hirsute, without elevated margins.

Maxillary feet and *sternite* sparsely punctured; anterior margin of the sternite bearing four teeth, two in contact in the middle line and one on each side; basal tooth conspicuous but simple.

Tergites punctured, with the exception of the first seven and last two, with raised lateral margins; the first marked anteriorly with a conspicuous transverse groove; the last narrow, with lateral margins nearly parallel; posterior margin between the joints of the legs convexly produced.

Sternites punctured, not marked with two sulci; the last

narrow, with gently rounded lateral margins and straight or slightly concave posterior margin.

Anal pleurites compressed, thickly and deeply punctured, below produced posteriorly into a simple sharp spine, which, like the posterior portion of the sclerite, is devoid of punctures; pleurites projecting considerably beyond the margin of the anal sternite, but not extending further posteriorly than the middle of the anal tergite; superior half of posterior margin vertical, inferior half gently sloping to the apex of the process.

Legs hirsute, more so distally than proximally; claws of all the legs furnished at the base with two spurs; tarsi of all the legs, the ultimate and penultimate pairs excepted, composed of a single segment; tibiae of twenty-third, twenty-second, and twenty-first pairs of legs unarmed, tibiae of twentieth pair armed beneath distally with a single spur, tibiae of the rest of the legs each armed distally with two spurs, one above and in front, the other below; tarsi of the twenty-second and twenty-third pairs unarmed, tarsi of the rest of the legs armed distally beneath with a single spur (the superior tibial spine of the nineteenth pair may be absent). Femur of anal legs armed proximally with two spines, one larger beneath, the other smaller above.

Measurements in millimetres of the largest specimen.—Length (from anterior margin of head-plate to posterior margin of anal tergite) 49; width of twelfth tergite $4\frac{1}{2}$; width and length of head-plate $3\frac{1}{4}$; width of anal tergite $2\frac{1}{4}$; length of anal leg 14; length of antenna 13.

Five specimens.

This species differs from *S. Miersii*, Newp., inasmuch as in the latter the anterior margin of the maxillary sternite is not furnished on each side with two teeth.

Fam. Geophilidae.

Geophilus tenuitarsis, sp. n.

No. of pairs of legs in male 85. Length about 35 millim.

Antennae hirsute at base, pubescent at apex, composed of fourteen segments, which increase very slightly in length to the fourth, then progressively decrease in length to the thirteenth; the fourteenth conspicuously longer than the thirteenth; distal extremity of each segment wider than the proximal.

Head-plate about as wide as it is long, with rounded lateral

borders and straight anterior and posterior borders; frontal lamina not distinct; prebasal lamina concealed by head-plate, which slightly overlaps the anterior portion of the basal lamina; basal lamina very wide.

Maxillary sternite large, considerably wider than it is long, feebly cut out into teeth in its anterior middle line, furnished with two patches of black colour in that region, and marked on each side with a distinct sulcus, which runs parallel to the long axis of the body from the middle of the joint of the maxillary feet to the posterior margin of the sternite. Maxillary feet, when closed, not reaching so far as the anterior border of the head-plate; coxæ and claw not armed on the inner side with teeth. Entire head hirsute.

Tergites strongly bisulcate, portion within the sulci slightly less smooth than the lateral portions.

Sternites oblong, not sulcate, and without conspicuous porous areas.

Anal tergite wider in front than behind; pleurites small, smooth, without pores; sternite wide, laterally covering the pleuræ, with rounded lateral margins and straight posterior margin. Anal legs hairy, very robust, proximal four segments compressed from side to side, but exceedingly thick from above downwards, increasing progressively in length towards the distal extremity; the inferior margin of the fourth segment behind produced into a small rounded process; the fifth and sixth segments small, cylindrical, the fifth articulating only with the upper portion of the distal extremity of the fourth; the sixth armed with a claw.

Anal pores not visible. All legs hirsute.

One specimen.

II. DIPLOPODA.

Fam. Polydesmidæ.

**Paradesmus gracilis* (C. Koch).

Fontaria gracilis, C. Koch, Syst. d. Myr. p. 142 (1847); Die Myriop. ii. p. 51, fig. 173 (1863).

Polydesmus coarctatus, Sauss. Mém. Mex. Myr. p. 39, pl. iii. fig. 18 (1860).

Paradesmus gracilis, Tömösvary, Termés. füz. iii. p. 246, pl. x. figs. 1-5 (1879).

Specimens of this species, which is tolerably commonly distributed throughout the tropical parts of both hemispheres, and has found its way into England and other European countries in connexion with exotic plants, were taken by Mr. G. F. Augas beneath a log in Dominica in 1883.

Strongylosoma semirugosum, sp. n.

? Syn. *Strongylosoma spilonotum*, Gerv. Ins. Apt. iv. p. 117.

Colour ochraceous above, with a faintly marked median, dorsal, paler band, testaceous beneath; legs and antennæ testaceous.

Tergites shining, the anterior half of each less so than the posterior, the latter feebly rugose; those of the posterior region of the body more rugose than those of the anterior; the posterior portion of each, with the exception of the first four and the last three, marked with a transverse groove, which extends almost from keel to keel; keel of the second somite appearing as a longitudinal ridge, keels of the third and fourth somewhat rounded and very small, those of the succeeding somites more rounded and larger; those keels that do not bear stigmata less conspicuous than those that are provided with them; first tergite without trace of keels, with rounded lateral margin; the lateral and antero-lateral margin with raised edge.

Head-plate marked above with a conspicuous median longitudinal groove, which extends from the area between the antennal sockets beneath the first tergite; lateral border of head-plate with raised margin; anterior margin beset with hairs, medianly excavated and laterally rounded. Distal four antennal segments thickly hirsute, the proximal three sparsely so.

Anal tergite produced behind into a rounded setiferous prominence, which considerably overlaps the anal valves, furnished with a transverse row of setæ; anal valves (pleurites) with elevated free margins; anal sternite evenly rounded.

Legs hirsute, the proximal segments less so than the distal; distal two segments in the male furnished beneath with a tuft of hairs.

Basal (internal) segment of copulatory foot of the male irregularly cylindrical; second segment small, projecting posteriorly, somewhat elliptical, with its long axis at right angles to that of the basal segment, densely hirsute; from its anterior surface springs a slightly twisted elongate lamina, distally bifid, and curled upon itself so that the bifid extremity is almost in contact with the proximal end of the segment.

Total length 28 millim., width $2\frac{1}{2}$ millim.

Five male specimens.

The descriptions of the American (and other) species of *Strongylosoma* are, with one or two exceptions, so brief that

the task of identifying specimens from them is by no means an easy one. However, short though they be, I have (with one exception) found set forth in each case one or more characters which afford me sufficient grounds for concluding that these specimens from Dominica belong to a species which is now for the first time described.

The following is a list of the species. After each I have stated the character which leads me to consider the species to be different from *semirugosum*.

Str. concolor, Gervais, Aptères, iv. p. 117.—Chili. This species is smooth, with subbifid anal tergite and squared anal sternite.

Str. spilonotum, id. ibid.—S. America. Cf. infra.

Str. coccineum, Saussure, Miss. Sci. Mex., Myriopodes, p. 50, pl. i. fig. 12.—Orizaba. There is no transverse sulcus on the hinder half of each tergite.

Str. vermiforme, id. Mém. Mex. Myriop. p. 40, pl. i. fig. 4.—Mexico. Tergites as in the preceding species.

Str. vermiculare, Peters, Monatsb. d. k. Akad. Berlin, 1864, p. 536.—Caraccas. The anal sternite is feebly tridentate.

Str. glabrum, id. ibid.—Columbia. This species is smooth.

Str. eruca, Wood, Journ. Acad. Nat. Sci. Phil. (1) ii. p. 106.—This species is said to be punctate.

Str. Poeyi, Bollman, Ent. Amer. iii. p. 82.—Havana. Tergites punctate.

Of the above species it is with *spilonotum* that *semirugosum* presents the greatest affinities; but Gervais's description, although applicable so far as it goes to the latter, is not sufficiently detailed to enable me to say with certainty that the two are identical.

Fam. Iulidæ.

Spirostreptus (Nodopyge) dominicanus, sp. n.

Species belonging to the Immucronate group of Brandt. Shining, piceous, posterior border of somites paler; antennæ and legs testaceous.

Head-plate.—Superior portion not marked in the middle line by a longitudinal sulcus; margin of the labrum furnished

with a row of somewhat close-set setæ, above which are three setiferous pores, one in the middle and one on each side about halfway between the middle and the lateral margin.

First tergite with anterior border sloping gradually away at the sides and not sharply marked off from the lateral margin; the lateral and antero-lateral border (as far as the ocular area) raised; lateral portion marked with a more or less complete sulcus, which runs from the anterior margin near the ocular region backwards and slightly downwards to the posterior margin; above the posterior end of this there are about six short sulci, which correspond with the longitudinal sulci marking the infero-lateral portions of the somites.

Each somite, except the last, divided into an anterior and a posterior half by a shallow depression, which in many species of the genus has the form merely of a streak; foramina repugnatoria situated in the middle of the sides of the somites a little behind this depression.

Anal tergite produced behind, so as to cover but not to pass beyond the superior angle of the anal valves; anal valves but little prominent, with simple unraised borders; anal sternite with rounded posterior margins.

Inferior surface of the legs sparsely hairy.

Four female specimens.

Length of adult not greater than 30 millim.

Unfortunately all the specimens obtained are in a fragmentary condition, and it is consequently impossible to estimate with exactness either the length of any one individual or the number of somites of which it is composed. And, further, the description is of necessity rendered additionally imperfect owing to the fact that the absence of a male has made it impossible to examine the copulatory apparatus of that sex and to determine whether the species is referable to the homomorphous or the heteromorphous group of the genus.

The species appears to be allied to *Sp. cinctus* (Humb. & Sauss.), but the latter is said to have a triangular subanal plate. It also presents affinities with *Sp. rotundanus* and *Sp. mellitus* (Karsch), but the descriptions of the latter do not satisfactorily apply to it in all particulars.

**Spirobolus paraensis*, Humb. & Sauss.

Spirobolus paraensis, Humb. & Sauss., Rev. et Mag. Zool. 1870, p. 176; Miss. Sci. Mex. (Myriopodes), p. 81, pl. iv. fig. 15.

Species without scobina.

Segments slate-coloured above and at the sides, paler be-

neath, each, the first two excepted, marked posteriorly in the dorsal middle line with a single pale spot, and on each side immediately in front of the foramen repugnatorium with a similar spot; legs, antennæ, labral region, anal valves, and posterior portion of anal tergite testaceous.

Body cylindrical; length 39, width 4 millim.; number of somites forty-three (adult).

Head-plate marked by a shallow median sulcus, which divides the labral region into two halves, and above is represented by a pale band of colour; labral region furnished on each side with two conspicuous setiferous punctures, one near the middle line, the other near the side margin. Eyes large, consisting of a somewhat quadrate mass of ocelli.

Antennæ short, not projecting laterally beyond the hind margin of the first tergite; proximal segments smooth and less narrowed proximally; distal segments scantily hirsute and more narrowed proximally.

First tergite not projecting below so far as the second, with rounded lateral margin, straight antero-lateral margin, and slightly raised antero-lateral border, the sulcus which marks the border extending from the ocular area almost to the posterior portion of the lateral margin.

Each somite, with the exception of the first and last, divided into a larger anterior and a smaller posterior portion by a complete transverse sulcus; laterally and inferiorly from this sulcus arise before and behind numerous secondary sulci, just as the webs of a feather arise from the shaft, those behind running longitudinally to the posterior margin of the somite, those in front running transversely towards the summit of the somite in a direction more or less parallel to the sulcus from which they originate; one of these, stronger than the rest, starting a little below the middle of the lateral surface, runs completely round the dorsum parallel with the main sulcus; in the space bounded by these sulci, but close to the posterior of the two, is, on each side, the foramen repugnatorium, which is situated within a loop of the last-named sulcus. Posterior (uncovered) portion of dorsal region of each somite (except the last) smooth and shining.

Anal somite.—Tergite produced behind into an apically rounded angular prominence, which covers the superior angle of the anal valves, but does not project beyond the valves; anterior portion of valves convex, posterior portion compressed, with prominent margins; posterior borders of valves conspicuously convex from above downwards; subanal plate with obtusely angled posterior margin.

Legs very smooth, the inferior surface of each segment being for the most part furnished distally with a single seta.

A single female specimen taken under a log by Mr. G. F. Angas.

* *Spirobolus dominicæ*, sp. n.

Species without scobina.

Colour reddish, posterior portion of each somite shining.

Length of adult male about 49 millim., width 4 millim.; number of somites forty-seven; sixth and seventh somites in the male slightly dilated laterally and much produced below.

Head-plate.—Inferior portion divided by a median sulcus, which disappears above; on each side of this are two setiferous punctures, one near the middle, the other near the lateral margin; inferior border angularly excised, the excision being filled with an obscurely denticulated plate. *Eyes* consisting of an almost circular mass of ocelli. *Antennæ* stretching laterally as far as the hind margin of the second somite; proximal segments bare and slightly narrowed proximally, distal segments sparsely hirsute and more narrowed proximally.

The *first tergite* not projecting so far below as the second, much narrowed laterally, the lateral portion of the anterior border lightly concave and receding somewhat abruptly from the superior portion of the same border; the anterior and posterior margins meeting at an angle of about 50° ; apex of the angle rounded, its border being marked by a conspicuous groove, which extends to the ocular area; upper surface irregularly and minutely punctured.

Somites not marked with a transverse circular sulcus, its position being occupied by a shallow depression. The lateral surface of each somite marked in front with very many close-set, interlacing, fine striæ, which behind pass into the usual longitudinal sulci; the dorsal surface of each is in front adorned with a fine network of ridges, the interspaces of which in the hinder portion of the somite become converted into irregularly shaped punctures. Foramina repugnatoria very minute, lodged just in front of the circular depression.

Anal somite.—Tergite produced behind into a broad angular process, the rounded angle of which covers and projects very slightly beyond the superior angles of the anal valves; anal valves convex in front, a little compressed behind, with borders not prominently convex from above downwards; sub-anal plate with rounded margin.

Legs almost smooth, each segment furnished beneath with a single seta; distal segment in male bearing pad beneath.

♂. Right and left portions of the copulatory apparatus united in front by a triangular plate, concave from side to side, two of the sides of which are slightly sinuous and converge below to a bifid point; the third and superior side is strongly concave; each of the upper angles of the plate is produced into a process which, at first slender, runs upwards and curls round the side of the anterior lamina, immediately dilates into a second triangular piece, which, abruptly narrowing behind, skirts the lateral superior margin of the anterior lamina and is continued inwards along that of the posterior lamina. Anterior aspect of anterior lamina narrower above, projecting for about a quarter of its length below the triangular plate; produced into two small blunt processes, one inner, the other outer, between which the inferior margin slopes obliquely upwards and outwards. Outer margin of front aspect of plate nearly straight and rounded; lateral aspect of plate somewhat heart-shaped, with the apex directed downwards; behind it meets the posterior lamina in a nearly vertical and straight suture. Posterior lamina irregularly oblong, about twice as high as it is wide; about the middle of the inner margin is a conspicuous notch, from which is continued inwards a deep groove, which quickly dilates into a wide depression occupying the greater part of the lower half of the lamina.

Attached on each side by a muscle to the upper part of the prolongation of the triangular plate is a slender rod, which, thicker in front and slightly curved, runs directly backwards to be articulated with the proximal end of the internal protrusible portion of the apparatus for which the anterior and posterior laminae described above constitute a sheath.

This internal protrusible portion consisting of two segments, the proximal of which is short and about one third the length of the distal segment; distal segment curved from above downwards, more or less wrinkled at the sides, partially hollowed behind, wider above and bluntly pointed at its distal extremity. From the middle of its posterior margin there arises a downwardly directed, compressed, and somewhat oblong tooth; from the lower surface of the base of this tooth spring two small slender processes, one inner, the other outer, the former being sharp, needle-like, and almost straight, the latter sharp and twisted upon itself. From the posterior surface of the distal extremity of this segment arises a somewhat membranous piece, which bifurcates and runs up towards the above-mentioned oblong tooth.

Three specimens (one male, two females) taken under a log by Mr. G. F. Angas.

Perhaps most nearly allied to *Sp. nietanus* and *heteropygus* of de Saussure; but in these two species the anal valves are not compressed.

EXPLANATION OF PLATE XVI.

- a. Otostigma cornocephalinum*, anterior extremity from above.
- a*¹. Ditto, ditto, from below.
- a*². Ditto, posterior extremity from below.
- b. Scolopocryptops Meinerti*, from above (nat. size).
- b*¹. Ditto, head from below.
- c. Geophilus tenuitarsis*, anterior extremity from above.
- c*¹. Ditto, ditto, from below.
- c*². Ditto, posterior extremity from below.
- c*³. Ditto, posterior leg from the side.
- d. Strongylosoma semirugosum*, 12th somite from above.
- d*¹. Ditto, anal somite from the side.
- d*². Ditto, copulatory foot.
- e. Spirostreptus dominicanus*, anterior extremity.
- e*¹. Ditto, posterior extremity.
- f. Spirobolus dominicæ*, anterior extremity.
- f*¹. Ditto, posterior extremity.
- f*². Ditto, copulatory organ from before.
- f*³. Ditto, ditto, from behind.
- f*⁴. Ditto, ditto, from the side.
- f*⁵. Ditto, ditto, central portion.
- f*⁶. Ditto, ditto, central portion (apex).

LXIII.—On the Mouth-organs of two Species of Rhysodidæ.

By GEORGE LEWIS, F.L.S.

By the kindness of the Rev. A. Matthews, who has dissected and drawn them, I am able to give outlines of the mouth-organs of *Rhysodes niponensis*, Lewis, and *Clinidium veneficum*, Lewis, of which descriptions appeared in the July number of this Magazine. Mr. Matthews found it exceedingly difficult to make the dissections, owing to the hardness of the chitinous parts; and it is solely due to Mr. Matthews's persistent industry and a sacrifice of a good many specimens that the results now given were obtained. Mr. Matthews considers, he has been completely successful with the *Clinidium*, "although the dissection of the smallest *Trichopteryx* would have been more easily accomplished, for the maxilla, labium, &c. are exceedingly fragile, while the surrounding integument is almost as hard as iron, and cannot be penetrated without more or less danger to the finer parts;" and he also says: "The organs of the mouth are, without exception, the most extraordinary I have ever seen: the labrum is very small, the epistoma, or, rather, the clypeus and the mentum, are very large and of the hardest and most impenetrable horn;